

Fraction Strips

Reporting Category Number and Number Sense

Topic Comparing, ordering, and representing fractions

Materials

- Colored construction paper
- Scissors
- Markers
- Letter-size, three-hole-punched envelopes
- Plastic food storage bags
- Sticky notes
- Chart paper

Vocabulary

fraction, whole, part, numerator, denominator, like denominators, unlike denominators, greater than, less than, equal to, represent, congruent

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Note: Before undertaking this activity, create a set of seven equal-size strips of different-colored construction paper for each student. Place a set of strips, a pair of scissors, a marker, and a three-hole-punched envelope in a plastic storage bag for each student.

1. Distribute sticky notes, and lead students in brainstorming ideas about fractions—what they remember from previous grades or experiences outside of school. Have them record their ideas on sticky notes and place them on a sheet of chart paper. (Students may put their initials on the backs of the sticky notes so they may be identified later for individual assessment of prior knowledge.) Accept all responses. At the end of the activity, students may examine their ideas and determine whether they are correct or incorrect.
2. Show students a set of fraction strips, and model how they can be used to solve a simple problem.
3. Give seven strips of colored construction paper, a pair of scissors, a marker, and a three-hole-punched envelope to each student. Explain that they will be creating their own set of fraction strips. As you work through the steps below, model each step with your own strips.
 - Ask students to label one strip “1” and lay it aside.
 - Have students fold a second strip in half, and discuss the two equal-size halves that result, demonstrating by folding that the two parts are congruent. Have them label each part $\frac{1}{2}$ and then cut on the fold. Ask students how many of the $\frac{1}{2}$ strips it will take

to cover the 1 strip. Have them place the two $\frac{1}{2}$ strips on the 1 strip to prove their answer, and write on the board $\frac{1}{2} + \frac{1}{2} = 1$. Have them lay the two $\frac{1}{2}$ strips aside.

- Repeat the same procedure for fourths, using a different-colored strip. At each step, discuss how many of the $\frac{1}{4}$ strips it takes to cover the 1 strip, and how many of the $\frac{1}{4}$ strips it takes to cover the $\frac{1}{2}$ strip. Enlist student responses to write the equations $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$ and $\frac{1}{4} + \frac{1}{4} + \frac{1}{2} = 1$.
- Repeat the same procedure for eighths, using a different-colored strip. At each step, discuss how many of the $\frac{1}{8}$ strips it takes to cover the 1, the $\frac{1}{4}$, and the $\frac{1}{2}$ strips. Continue enlisting student responses to write appropriate equations.
- Repeat the same procedure for thirds, using a different-colored strip. This step takes a little more practice to fold the strip into three equal-size parts, or you may have students use a ruler to mark the strip in thirds. At each step, discuss how many of the $\frac{1}{3}$ strips it takes to cover the 1 strip. Ask how many of the $\frac{1}{3}$ strips it will take to cover the $\frac{1}{2}$. Students will discover that thirds will not cover the half exactly. Continue enlisting student responses to write appropriate equations.
- Repeat the same procedure for sixths, using a different-colored strip. Have students make three more $\frac{1}{3}$ strips according to the procedure already used, and then have them fold each strip in half and cut on the folds to get six equal-size strips. Ask how many of the $\frac{1}{6}$ strips it will take to cover the 1, the $\frac{1}{2}$, and the $\frac{1}{4}$ strips. Students will discover that sixths will not cover the fourth exactly. Continue enlisting student responses to write appropriate equations.
- At this point, you may want the students to explore twelfths on their own and share with partners how they would create the $\frac{1}{12}$ strips. Continue enlisting student responses to write appropriate equations.
- Have the students write their name on all their fraction strips, place them in their three-hole-punched envelopes, and store the envelopes in their binders.

NOTE: This activity should help the students visualize fractions and begin to conceptualize the relationships between the common fractions. The process of folding and cutting, however, is not an exact one, and the handmade strips may lead to incorrect comparisons.

4. Have students refer back to their sticky notes from the beginning of the activity. Help them reflect on the concepts that were demonstrated in the activity. Ask students to verbalize the concepts learned in this activity, including pictorial representations, if applicable. The concepts should include:
 - A fraction is a way of representing part of a whole or part of a group.
 - A fraction is used to name a part of one thing.
 - Wholes can be broken into equal-size parts, and the parts can be reassembled into wholes.
 - Equal-size parts have special names: halves, thirds, fourths or quarters, sixths, eighths, twelfths.
5. Organize the sticky notes on a wall chart by having the students indicate in which of two columns, "Correct" or "Need More Information," the ideas should be placed.

Assessment

- **Questions**

- What did you notice about the $\frac{1}{2}$ and the $\frac{1}{8}$ strips that was the same?
- What did you notice about the $\frac{1}{2}$ and the $\frac{1}{8}$ strips that was different?

- **Journal/Writing Prompts**

- Write three "I discovered..." statements about the fraction strips that you created. Use the terms "greater than," "less than," "or equal to." For example, "I discovered that $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} < 1$."
- Describe the relationship between the different fractions, e.g., $\frac{1}{4}$ and $\frac{1}{6}$. What do you notice about the relationship between the denominator and the fraction strip?

- **Other**

- Make an Exit Card by folding a piece of paper into four sections and having students respond to the following questions:

A fraction is...	$\frac{1}{4} + \frac{1}{4} =$ Write another equation using either =, <, or >.
You are sharing a candy bar among yourself and three friends. What fraction does each person get?	A question I still have about fractions is:

Extensions and Connections (for all students)

- Have students create a list of things that come in halves, thirds, fourths or quarters, sixths, eighths, or twelfths. Try to list at least two items for each fraction word.

- Have students create study-style index cards for each fraction strip: on one side, write the fraction, and on the other side, write information or clues that help you understand the relationship of the fraction to one whole, as shown below:

Front of card

$$\frac{1}{2}$$

Back of card

- One of two equal parts
 - The whole divided equally into two halves
- (Maybe include an illustrated example here.)